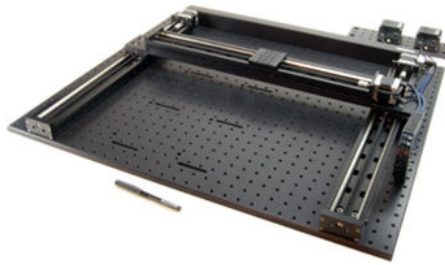# ZABER

G-LSQ Product
User's Manual
Firmware 5.00 and up

Last Update: December 10 2015
Visit www.zaber.com/wiki for more recent updates.

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Disclaimer

Zaber's devices are not intended for use in any critical medical, aviation, or military applications or situations where a product's use or failure could cause personal injury, death, or damage to property. Zaber disclaims any and all liability for injury or other damages resulting from the use of our products.

Precautions

Zaber's linear stages can produce enough force to cause personal injury. Be careful to not get body parts caught between the moving carriage and the end plates of the stage. Make sure that no loose clothing gets caught in the rotating lead screw.

Maintenance

Teflon-coated (black) lead screws are not designed to be greased. Normally no lubrication is required over the lifetime of the device. If a squeaking sound develops in the lead screw, Super Lube oil with PTFE (Product number #51004) can be applied. Apply a very thin bead over 80% of the contact surface of the lead screw and run the stage slowly from end to end. Wipe off any excess.

Operation

The G-LSQ stages are designed to be controlled with any of Zaber's multi-axis X-Series or A-Series Stepper Motor Controllers. Zaber's controllers and peripherals are designed for ease of use when used together. Optimal settings for each peripheral (such as the default current, speed, acceleration, and limit settings) can be loaded by setting the peripheralid (T:66) on the controller. The peripheral ID is listed as the ID on the peripheral's label. A list of IDs is also available on the ID Mapping page. For more information on device operation, refer to the controller's user manual.

Tensioning Timing Belt and Aligning Lower Axis Stages

If the lower axis of a G-LSQ gantry system needs to be re-aligned, follow the instructions below.
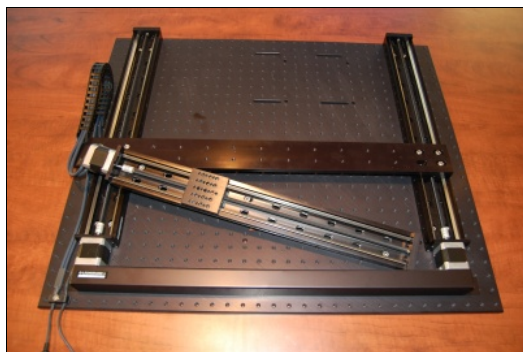
Parts Identification
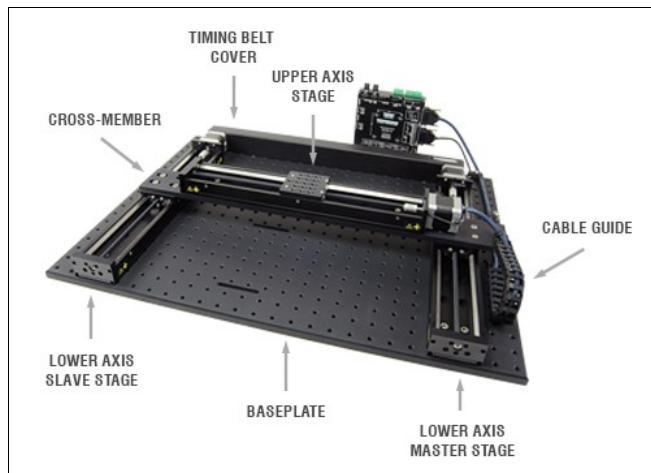
G-LSQ Gantry System Components

Alignment Procedure

- Move lower and upper axes stages to a position where all the screws holding the stages to the baseplate and cross-member are accessible.
- Remove top stage.

Upper axis stage removed

• Loosen cross-member screws.
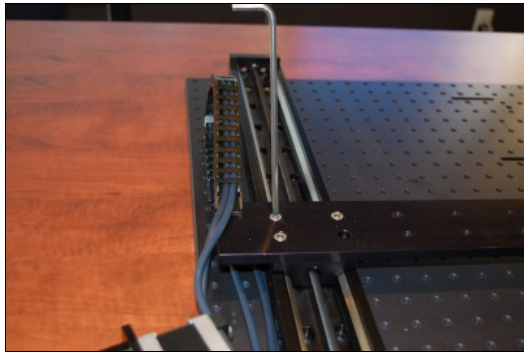
Loosen cross-member screws

• Remove timing belt cover.
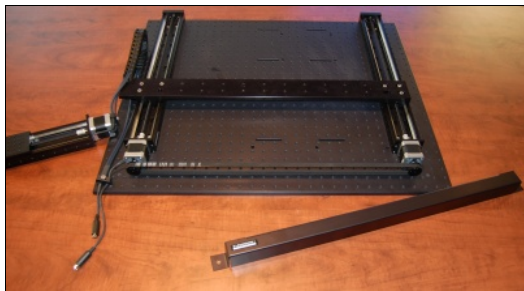
Remove timing belt cover

• Loosen the screws holding the lower axis stages to the baseplate by about 1/4 turn.

Loosen mounting screws on both master and slave stages

• Slide slave stage towards master stage to release tension on timing belt.
• Check that dowel pins are installed (3 for master stage, 1 for slave).

2 dowel pins should be installed near the motor end of the master stage

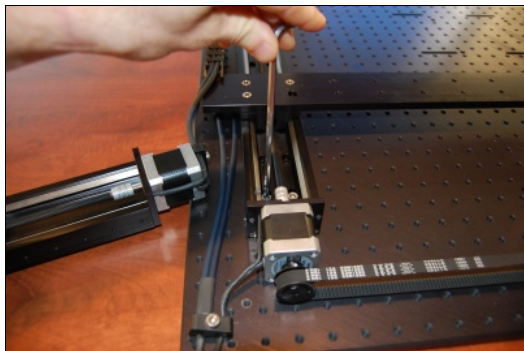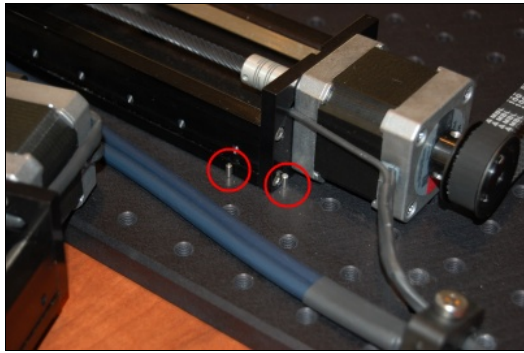1 dowel pin should be installed near the far end of the master stage

1 dowel pin should be installed near the motor end of the slave stage

- If dowel pins are not installed, install them. They should need only a light tap to insert. Use only 3/32" dowel pins.
- Push master stage against dowel pins and tighten screws holding stage to baseplate
- While holding slave stage against dowel pin, slide the stage away from the master stage until the timing belt is taught. Try to keep the stage as parallel to the master stage as possible. While holding the stage in position, tighten one of the screws near the motor end of the stage and one screw near the opposite end of the stage. Don't worry that the stages are not perfectly parallel. They will be aligned in the following steps.
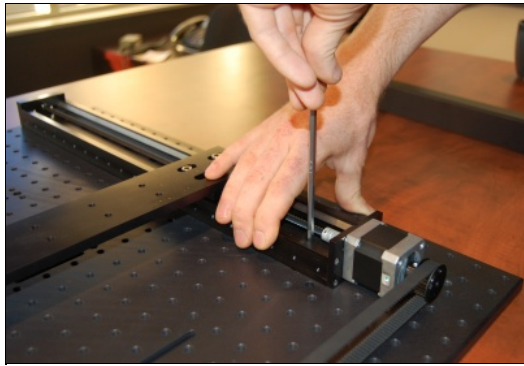
Tension the timing belt and tighten the mounting screws on the slave stage

- Tighten the cross-member to master stage screws. Leave the screws on the slave stage side loose.
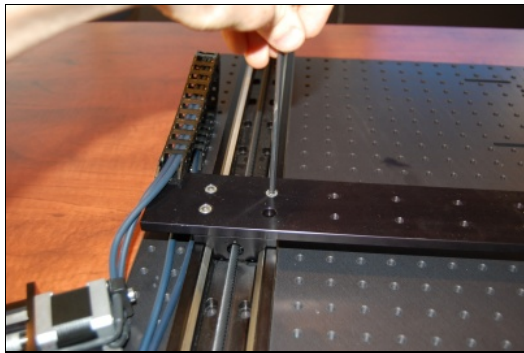
Tighten the cross-memeber to master stage screws

- Re-install the top axis stage.
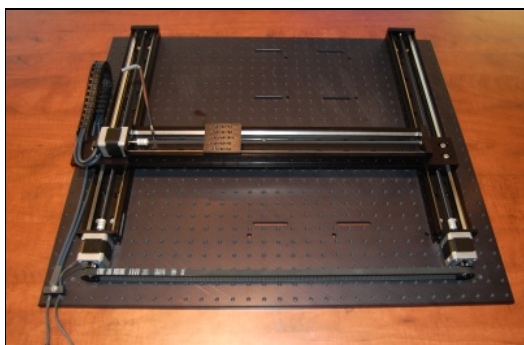
Re-install the upper axis stage

- Move the lower axis to the home position.
- Tighten the cross-member to slave stage screws.
- Loosen the screw you previously tightened near the maximum travel position of the slave stage. Both screws at this end of the stage should now be loose.

- Using the controller pot knob, move the lower axis towards the maximum travel position. The cross-member should move the slave stage into alignment with the master. When the cross-member gets close to the end of travel, stop the movement and tighten one of the screws at the far end of the slave stage to hold it in position.
- As the alignment of the slave stage changes, you will notice that the belt tension will change as well. The proper timing belt tension is very important for proper operation of the gantry system. If the belt is too tight, the lower axis may not be able to reach its maximum speed and the motor bearings will wear out prematurely. If it is too loose, the backlash will increase. See the table below for the maximum speed of your gantry system when the timing belt is properly tensioned. The maximum speed is a good indication of proper tension. If the belt tension needs to be adjusted, loosen the cross-member screws and the mounting screws near the motor end of the slave stage and swing this end of the stage towards or away from the master stage as necessary to adjust the belt tension. Tighten one of the screws and repeat the alignment process described above. Properly tensioning the belt and aligning the slave stage is an iterative process and make take several tries to get right.
- Re-install the timing belt cover.

Speed Range for Gantry with Properly Tensioned Timing Belt Using T-MCA Controller

Gantry System	Maximum Speed
G-LSQxxxAxxxA	30000-32000
G-LSQxxxBxxxB	30000-32000
G-LSQxxxDxxxD	18000-20000

Warranty and Repair

For Zaber's policies on warranty and repair, please refer to the <u>Ordering Policies</u>

Standard products

Standard products are any part numbers that do not contain the suffix ENG followed by a 4 digit number. Most, but not all, standard products are listed for sale on our website. All standard Zaber products are backed by a one-month satisfaction guarantee. If you are not satisfied with your purchase, we will refund your payment minus any shipping charges. Goods must be in brand new saleable condition with no marks. Zaber products are guaranteed for one year. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

Custom products

Custom products are any part numbers containing the suffix ENG followed by a 4 digit number. Each of these products has been designed for a custom application for a particular customer. Custom products are guaranteed for one year, unless explicitly stated otherwise. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

How to return products

Customers with devices in need of return or repair should contact Zaber to obtain an RMA form which must be filled out and sent back to us to receive an RMA number. The RMA form contains instructions for packing and returning the device. The specified RMA number must be included on the shipment to ensure timely processing.

Email Updates

If you would like to receive our periodic email newsletter including product updates and promotions, please sign up online at www.zaber.com (news section). Newsletters typically include a promotional offer worth at least $100.

Contact Information

Contact Zaber Technologies Inc by any of the following methods:

Phone	1-604-569-3780 (direct) 1-888-276-8033 (toll free in North America)
Fax	1-604-648-8033
Mail	#2 - 605 West Kent Ave. N., Vancouver, British Columbia, Canada, V6P 6T7
Web	www.zaber.com
Email	Please visit our website for up to date email contact information.

The original instructions for this product are available at http://www.zaber.com/wiki/Manuals/G-LSQ.

Appendix A: Default Settings

see our website

Appendix B: Device Specifications

For complete device specifications for G-LSQ gantries please see <u>our website</u>.

Specification	Value	Alternate Unit
Integrated Controller	No	
Recommended Controller	X-MCB2 (48 V) Included	
Repeatability	< 4 μm	< 0.000157 "
Encoder Type	None	
Maximum Centered Load	180 N	40.4 lb
Maximum Cantilever Load	800 N-cm	1,132.9 oz-in
Guide Type	Roller Bearing	
Maximum Current Draw	1200 mA	
Motor Steps Per Rev	200	
Motor Type	Stepper (2 phase)	
Motor Rated Current	1200 mA/phase	
Motor Winding Resistance	3.3 ohms/phase	
Inductance	2.8 mH/phase	
Motor Rated Power	9.6 Watts	
Motor Connection	D-sub 15	
Mechanical Drive System	Precision lead screw	
Limit or Home Sensing	Magnetic home sensor	
Axes of Motion	2	
Mounting Interface	M6 threaded holes and 8-32 threaded holes	
Operating Temperature Range	0 to 50 degrees C	
Stage Parallelism	< 100 μm	< 0.003937 "
RoHS Compliant	Yes	
CE Compliant	Yes	

Comparison - G-LSQ Series

Part Number	Microstep Size (Default Resolution)	Travel Range	Accuracy (unidirectional)	Backlash
G-LSQ150A150A-T4	0.09921875 μm	150 x 150 mm (5.906 ")	45 μm (0.001772 ")	< 8 μm (< 0.000315 ")
G-LSQ150B150B-T4	0.49609375 μm			

Part Number		Travel		
		150 x 150 mm (5.906 ")	15 μm (0.000591 ")	< 20 μm (< 0.000787 ")
G-LSQ150D150D-T4	1.984375 μm	150 x 150 mm (5.906 ")	15 μm (0.000591 ")	< 80 μm (< 0.003150 ")
G-LSQ300A300A-T4	0.09921875 μm	300 x 300 mm (11.811 ")	90 μm (0.003543 ")	< 8 μm (< 0.000315 ")
G-LSQ300B300B-T4	0.49609375 μm	300 x 300 mm (11.811 ")	30 μm (0.001181 ")	< 20 μm (< 0.000787 ")
G-LSQ300D300D-T4	1.984375 μm	300 x 300 mm (11.811 ")	30 μm (0.001181 ")	< 80 μm (< 0.003150 ")
G-LSQ450A450A-T4	0.09921875 μm	450 x 450 mm (17.717 ")	135 μm (0.005315 ")	< 8 μm (< 0.000315 ")
G-LSQ450B450B-T4	0.49609375 μm	450 x 450 mm (17.717 ")	45 μm (0.001772 ")	< 20 μm (< 0.000787 ")
G-LSQ450D450D-T4	1.984375 μm	450 x 450 mm (17.717 ")	45 μm (0.001772 ")	< 80 μm (< 0.003150 ")

Part Number	Maximum Speed	Minimum Speed	Speed Resolution	Peak Thrust
G-LSQ150A150A-T4	23 mm/s (0.906 "/s)	0.00093 mm/s (0.00004 "/s)	0.00093 mm/s (0.00004 "/s)	140 N (31.4 lb)
G-LSQ150B150B-T4	120 mm/s (4.724 "/s)	0.00465 mm/s (0.00018 "/s)	0.00465 mm/s (0.00018 "/s)	70 N (15.7 lb)
G-LSQ150D150D-T4	330 mm/s (12.992 "/s)	0.0186 mm/s (0.00073 "/s)	0.0186 mm/s (0.00073 "/s)	10 N (2.2 lb)
G-LSQ300A300A-T4	23 mm/s (0.906 "/s)	0.00093 mm/s (0.00004 "/s)	0.00093 mm/s (0.00004 "/s)	140 N (31.4 lb)
G-LSQ300B300B-T4	120 mm/s (4.724 "/s)	0.00465 mm/s (0.00018 "/s)	0.00465 mm/s (0.00018 "/s)	70 N (15.7 lb)
G-LSQ300D300D-T4	330 mm/s (12.992 "/s)	0.0186 mm/s (0.00073 "/s)	0.0186 mm/s (0.00073 "/s)	10 N (2.2 lb)
G-LSQ450A450A-T4	23 mm/s (0.906 "/s)	0.00093 mm/s (0.00004 "/s)	0.00093 mm/s (0.00004 "/s)	140 N (31.4 lb)
G-LSQ450B450B-T4				

	120 mm/s (4.724 "/s)	0.00465 mm/s (0.00018 "/s)	0.00465 mm/s (0.00018 "/s)	70 N (15.7 lb)
G-LSQ450D450D-T4	330 mm/s (12.992 "/s)	0.0186 mm/s (0.00073 "/s)	0.0186 mm/s (0.00073 "/s)	10 N (2.2 lb)

Part Number	Maximum Continuous Thrust	Vertical Runout	Linear Motion Per Motor Rev	Weight
G-LSQ150A150A-T4	100 N (22.4 lb)	< 13 μm (< 0.000512 ")	1.27 mm (0.050 ")	10.41 kg
G-LSQ150B150B-T4	70 N (15.7 lb)	< 13 μm (< 0.000512 ")	6.35 mm (0.250 ")	10.41 kg
G-LSQ150D150D-T4	10 N (2.2 lb)	< 50 μm (< 0.001969 ")	25.4 mm (1.000 ")	10.41 kg
G-LSQ300A300A-T4	70 N (15.7 lb)	< 13 μm (< 0.000512 ")	1.27 mm (0.050 ")	17.51 kg
G-LSQ300B300B-T4	70 N (15.7 lb)	< 13 μm (< 0.000512 ")	6.35 mm (0.250 ")	17.51 kg
G-LSQ300D300D-T4	10 N (2.2 lb)	< 76 μm (< 0.002992 ")	25.4 mm (1.000 ")	17.51 kg
G-LSQ450A450A-T4	140 N (31.4 lb)	< 13 μm (< 0.000512 ")	1.27 mm (0.050 ")	25.62 kg
G-LSQ450B450B-T4	100 N (22.4 lb)	< 13 μm (< 0.000512 ")	6.35 mm (0.250 ")	25.62 kg
G-LSQ450D450D-T4	10 N (2.2 lb)	< 200 μm (< 0.007874 ")	25.4 mm (1.000 ")	25.62 kg